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Scanning the Issue

On Bandwidth, *Slepian*, p. 292—This thought-provoking paper starts off with a provocative question and a provocative response: "Are signals really bandlimited? They seem to be, and yet they seem not to be." Anyone reading these first two sentences cannot fail to read further. The general reader will be rewarded by an intriguing philosophical discussion of the distinction between models and reality. The author points out that physical science and engineering are composed of an amalgam of two distinctly different components, which he labels as Facet A and Facet B. Facet A consists of observations on, and manipulations of, the "real world." In contrast, Facet B is a mathematical model and the means for operating within this model. Symbols, and the means and rules for manipulating these symbols, including the minds of men and women involved with the symbols—these comprise Facet B. Most of us like to think that there is an intimate relationship between Facets A and B, but a close examination reveals a correspondence that is most incomplete, tenuous, and imprecise. Although we can credit the impressive progress we have made in science and technology to this correspondence, careful reflection causes us to marvel that this progress could arise from such a ragged fit between the two facets. Following this discussion of the role of models in the exact sciences, the paper returns to the subject of bandwidth, and the author applies the discussion to answer the opening question. He then presents a new formulation of the $2WT$ theorem. Except for an added appendix, this paper is a written version of the second Shannon Lecture given at the 1974 International Symposium on Information Theory.

Electromagnetic Fields in the Presence of Rotating Bodies (*Invited Paper*), *Van Bladel*, p. 301—It is appropriate for a treatment of fields in the presence of rotating bodies to begin by mentioning where such situations are encountered in electrical engineering. The application that first comes to mind is the electrical machine, but there are many others, including a fly wheel with magnetic suspension, a plasma column rotating in a magnetic field, and a space object or the blades of a propeller in an electromagnetic field. Traditionally, the field in the presence of a rotating body is calculated by assuming that it has the value at any given time corresponding to the instantaneous position of the body "frozen in its tracks." Although this "quasi-stationary" approach yields an adequate approximation at low angular velocities, it gives no information about the dynamics or relativistic corrections, which require solution of the generalized Maxwell equations in coordinates that are "glued" to the rotating body. The paper discusses the general formulation of the problem and illustrates the theory by solving the simple configuration of a cylinder immersed in an incident E wave under several conditions. This tutorial treatment is of interest not only because it describes a little explored line of research but also because it provides an example of the solution of a complex problem in a clear theoretical fashion.

Wide-Band Guided-Wave Acoustooptic Bragg Diffraction and Devices Using Multiple Tilted Surface Acoustic Waves, *Tsai et al.*, p. 318—Acoustooptic Bragg interaction, involving surface acoustic waves (SAW) and guided optical waves, is a promising subject of considerable current interest. This paper presents theoretical and experimental studies showing that very wide-band high-efficiency guided-wave acoustooptic Bragg devices can be realized by employing multiple SAW's that are staggered in frequency and tilted in propagation direction. Design and performance figures of devices involving three and four tilted SAW's are described in detail. The performance figures achieved to date already far exceed those obtained with devices employing a single SAW. These results demonstrate some of the potential advantages of the devices over their bulk-type counterparts. Possible applications, in addition to those common to bulk-type devices, include processing of wide-band RF signals, high-speed optical pulse modulation, acoustooptic spectrum analysis of wide-band RF signals, and high-speed multiport beam switching and deflection for fiber- and integrated-optics systems.

A Perceptual Channel for Information Transfer over Kilometer Distances: Historical Perspective and Recent Research, *Puthoff and Targ*, p. 329—In a series of experiments carried out at Stanford Research Institute, both experienced subjects and inexperienced volunteers were able to describe scenes being viewed at unknown remote locations by other members of the experimental team—sometimes with great accuracy, and always under carefully designed experimental protocol. The possible existence of such an ESP channel is significant to electrical engineers, who have the background and knowledge to exploit statistically described channels through the principles of communication and information theory. The great potential importance of this work, should it be substantiated by replication and further research, weighed heavily in the carefully considered decision to publish this paper in the PROCEEDINGS. We realize that many of our readers will think this an ill-considered decision, as did one of the engineers we consulted who said, "This is the kind of thing that I would not believe in even if it existed." However, it is our opinion that the majority of electrical engineers believe that the investigation of ESP is a legitimate scientific undertaking, regardless of their belief in its ultimate existence. Furthermore, we believe that the authors have been careful and sincere in the design and reporting of this experiment. Their work deserves scientific consideration and objective criticism. We would encourage others to repeat these experiments and to report their results, whether they be positive or negative. We would also welcome critiques of the experiment itself. In any event, the paper itself may be the most readable ever published in this journal, and few readers will finish without wondering for at least a moment if indeed ESP might be possible after all. What a difference it would make to us all!